#4


```
atggggaaaa cagtcgttgg ggccagtagg atgttctggc taatgttttt cgtgccgctt      60
cttcttgcgc tctgccccag cgagcccgcg catgccctgg cacccggatc gagccgagtt     120
gagctgttta agcggcaaag ctcgaaggtg ccatttgaaa agggcggcaa agtcaccgag     180
cgggttgtcc actcgttccg cctccccgcc cttgttaatg tggacggggt gatggttgcc     240
atcgcggacg ctcgctacga aacatccaat gacaactccc tcattgatac ggtggcgaag     300
tacagcgtgg acgatgggga gacgtgggag acccaaattg ccatcaagaa cagtcgtgca     360
tcgtctgttt ctcgtgtggt ggatcccaca gtgattgtga agggcaacaa gctttacgtc     420
ctggttggaa gctacaacag ttcgaggagc tactggacgt cgcatggtga tgcgagagac     480
tgggatattc tgcttgccgt tggtgaggtc acgaagtcca ctgcgggcgg caagataact     540
gcgagtatca aatgggggag ccccgtgtca ctgaaggaat ttttcccggc ggaaatggaa     600
ggaatgcaca caaatcaatt tcttggcggt gcaggtgttg ccattgtggc gtccaacggg     660
aatcttgtgt accctgtgca ggttacgaac aaaaagaagc aagtttttc caagatcttc      720
tactcggaag acgagggcaa gacgtggaag tttggggagg gtaggagtga ttttggctgc     780
tctgaacctg tggcccttga gtgggagggg aagctcatca taaacactcg agttgactat     840
cgccgccgtc tggtgtacga gtccagtgac atggggaatt cgtgggtgga ggctgtcggc     900
acgctctcac gtgtgtgggg cccctcacca aaatcgaacc agcccggcag tcagagcagc     960
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aagggaaggt ggctgcgcga ccgactgaac ctctggctga cggataacca gcgcatttat    1080
aacgttgggc aagtatccat tggtgatgaa aattccgcct acagctccgt cctgtacaag    1140
gatgataagc tgtactgttt gcatgagatc aacagtaacg aggtgtacag ccttgttttt    1200
gcgcgcctgg ttggcgagct acggatcatt aaatcagtgc tgcagtcctg gaagaattgg    1260
gacagccacc tgtccagcat ttgcaccctc gctgatccag ccgcttcgtc gtcagagcgt    1320
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gttccgaacg gtttgaagtt tgcgggggtt ggcggagggg cgctttggcc ggtgagccag    1500
caggggcaga atcaacggta tcactttgca aaccacgcgt tcacgctggt ggcgtcggtg    1560
acgattcacg aggttccgag cgtcgcgagt cctttgctgg gtgcgagcct ggactcttct    1620
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tatggaagga gtgatatgcc aaccataagc cacgtgacgg tgaataatgt tcttctttac    1920
aaccgtcagc tgaatgccga ggagatcagg accttgttct tgagccagga cctgattggc    1980
acggaagcac acatgggcag cagcagcggc agcagtgccc acagtacgcc ctcaactccc    2040
gctgacaacg gtgcccacag tacgccctca actcccgctg acagcagtgc ccacagtacg    2100
ccctcaactc ccgctgacag cagtgcccac agtacgccct cagctcccgg tgacaacggt    2160
gcccacagta cgccctcgac tcccggtgac agcagtgccc acagtacgcc ctcaactccc    2220
gctgacaacg gtgcccacag tacgccctca gctcccgctg acagcaatgc ccacagtacg    2280
ccctcgactc ccgctgacaa cggtgcccac agtacgccct caactcccgc tgacaacggt    2340
gcccacagta cgccctcgac tcccggtgac aacggtgccc acagtacgcc ctcgactccc    2400
ggtgacagca gtgcccacag tacgccctca actcccgctg acaacggtgc ccacagtacg    2460
ccctcagctc ccgctgacag caatgcccac agtacgccct cgactcccgg tgacaacggt    2520
gcccacagta cgccctcagc tcccgctgac agcaatgccc acagtacgcc ctcgactccc    2580
gctgacagca gtgcccacag tacgccctca gctcccggtg acaacggtgc ccacagtacg    2640
ccctcagctc ccgctgacag cagtgcccac agtacgccct cagctcccgg tgacaacggt    2700
gcccacagta cgccctcagc tcccgctgac aacggtgccc acagtacgcc ctcagctccc    2760
ggtgacagca atgcccacag tacgccctcg actcccgctg acagcagtgc ccacagtacg    2820
ccctcaactc ccgctgacag cagtgcccac agtacgccct cagctcccgg tgacaacggt    2880
gcccacagta cgccctcagc tcccgctgac agcagtgccc acagtacgcc ctcaattccc    2940
ggtgacagca gtgcccacag tacgccctca gctcccgctg acagcagtgc ccacagtacg    3000
ccctcagctc ccggtgacaa cggtgcccac agtacgccct cgactcccgc tgacaacggc    3060
gctaatggta cggttttgat tttgcacgat ggcgctgcat tttcggcctt ttcgggcgga    3120
gggcttcttt tgtgtgcggg tgctttgctg ctgcacgtgt tcgttatggc agttttttttc    3180
tga                                                                 3183
```

FIG.1

MGKTVVGASRMFWLMFFVPLLLALCPSEPAHALAPGSSRVELFK
RQSSKVPFEKGGKVTERVVHSFRLPALVNVDGVMVAIADARYETSNDNSLIDTVAKYS
VDDGETWETQIAIKNSRASSVSRVVDPTVIVKGNKLYVLVGSYNSSRSYWTSHGDARD
WDILLAVGEVTKSTAGGKITASIKWGSPVSLKEFFPAEMEGMHTNQFLGGAGVAIVAS
NGNLVYPVQVTNKKKQVFSKIFYSEDEGKTWKFGEGRSDFGCSEPVALEWEGKLIINT
RVDYRRRLVYESSDMGNSWVEAVGTLSRVWGPSPKSNQPGSQSSFTAVTIEGMRVMLF
THPLNFKGRWLRDRLNLWLTDNQRIYNVGQVSIGDENSAYSSVLYKDDKLYCLHEINS
NEVYSLVFARLVGELRIIKSVLQSWKNWDSHLSSICTPADPAASSSERGCGPAVTTVG
LVGFLSHSATKTEWEDAYRCVNASTANAERVPNGLKFAGVGGGALWPVSQQGQNQRYH
FANHAFTLVASVTIHEVPSVASPLLGASLDSSGGKKLLGLSYDEKHQWQPIYGSTPVT
PTGSWEMGKRYHVVLTMANKIGSVYIDGEPLEGSGQTVVPDGRTPDISHFYVGGYGRS
DMPTISHVTVNNVLLYNRQLNAEEIRTLFLSQDLIGTEAHMGSSSGSSAHSTPSTPAD
NGAHSTPSTPADSSAHSTPSTPADSSAHSTPSAPGDNGAHSTPSTPGDSSAHSTPSTP
ADNGAHSTPSAPADSNAHSTPSTPADNGAHSTPSTPADNGAHSTPSTPGDNGAHSTPS
TPGDSSAHSTPSTPADNGAHSTPSAPADSNAHSTPSTPGDNGAHSTPSAPADSNAHST
PSTPADSSAHSTPSAPGDNGAHSTPSAPADSSAHSTPSAPGDNGAHSTPSAPADNGAH
STPSAPGDSNAHSTPSTPADSSAHSTPSTPADSSAHSTPSAPGDNGAHSTPSAPADSS
AHSTPSIPGDSSAHSTPSAPADSSAHSTPSAPGDNGAHSTPSTPADNGANGTVLILHD
GAAFSAFSGGGLLLCAGALLLHVFVMAVFF

FIG.2

```
atgctggcac ccggatcgag ccgagttgag ctgtttaagc ggcaaagctc gaaggtgcca
tttgaaaagg acggcaaagt caccgagcgg gttgtccact cgttccgcct ccccgccctt
gttaatgtgg acggggtgat ggttgccatc gcggacgctc gctacgaaac atccaatgac
aactccctca ttgatacggt ggcgaagtac agcgtggacg atggggagac gtgggagacc
caaattgcca tcaagaacag tcgtgcatcg tctgtttctc gtgtggtgga tcccacagtg
attgtgaagg gcaacaagct ttacgtcctg gttggaagct acaacagttc gaggagctac
tggacgtcgc atggtgatgc gagagactgg gatattctgc ttgccgttgg tgaggtcacg
aagtccactg cgggcggcaa gataactgcg agtatcaaat gggggagccc cgtgtcactg
aaggaatttt ttccggcgga aatggaagga atgcacacaa atcaatttct tggcggtgca
ggtgttgcca ttgtggcgtc caacgggaat cttgtgtacc ctgtgcaggt tacgaacaaa
aagaagcaag ttttttccaa gatcttctac tcggaagacg agggcaagac gtggaagttt
gggaagggta ggagcgcttt tggctgctct gaacctgtgg cccttgagtg ggagggggaag
ctcatcataa acactcgagt tgactatcgc cgccgtctgg tgtacgagtc cagtgacatg
gggaattcgt ggctggaggc tgtcggcacg ctctcacgtg tgtggggccc ctcaccaaaa
tcgaaccagc ccggcagtca gagcagcttc actgccgtga ccatcgaggg aatgcgtgtt
atgctcttca cacacccgct gaattttaag ggaaggtggc tgcgcgaccg actgaacctc
tggctgacgg ataaccagcg catttataac gttgggcaag tatccattgg tgatgaaaat
tccgcctaca gctccgtcct gtacaaggat gataagctgt actgtttgca tgagatcaac
agtaacgagg tgtacagcct tgtttttgcg cgcctggttg gcgagctacg gatcattaaa
tcagtgctgc agtcctggaa gaattgggac agccacctgt ccagcatttg caccctgct
gatccagccg cttcgtcgtc agagcgtggt tgtggtcccg ctgtcaccac ggttggtctt
gttggctttt tgtcgcacag tgccaccaaa accgaatggg aggatgcgta ccgctgcgtg
aacgcaagca cggcaaatgc ggagagggtt ccgaacggtt tgaagtttgc ggggttggc
ggaggggcgc tttggccggt gagccagcag gggcagaatc aacggtatcg ctttgcaaac
cacgcgttca ccgtggtggc gtcggtgacg attcacgagg ttccgagcgt cgcgagtcct
ttgctgggtg cgagcctgga ctcttctggt ggcaaaaaac tcctggggct ctcgtacgac
gagaggcacc agtggcagcc aatatacgga tcaacgccgg tgacgccgac cggatcgtgg
gagatgggta agaggtacca cgtggttctt acgatggcga ataaaattgg ctccgagtac
attgatggag aacctctgga gggttcaggg cagaccgttg tgccagacga gaggacgcct
gacatctccc acttctacgt tggcgggtat aaaaggagtg atatgccaac cataagccac
gtgacggtga ataatgttct tctttacaac cgtcagctga atgccgagga gatcaggacc
ttgttcttga gccaggacct gattggcacg gaagcacaca tggacagcag cagcgacacg
agtgcctga
```

FIG.3

MLAPGSSRVELFKRQSSKVPFEKDGKVTERVVHSFRLPALVNVD
GVMVAIADARYETSNDNSLIDTVAKYSVDDGETWETQIAIKNSRASSVSRVVDPTVIV
KGNKLYVLVGSYNSSRSYWTSHGDARDWDILLAVGEVTKSTAGGKITASIKWGSPVSL
KEFFPAEMEGMHTNQFLGGAGVAIVASNGNLVYPVQVTNKKKQVFSKIFYSEDEGKTW
KFGKGRSAFGCSEPVALEWEGKLIINTRVDYRRRLVYESSDMGNSWLEAVGTLSRVWG
PSPKSNQPGSQSSFTAVTIEGMRVMLFTHPLNFKGRWLRDRLNLWLTDNQRIYNVGQV
SIGDENSAYSSVLYKDDKLYCLHEINSNEVYSLVFARLVGELRIIKSVLQSWKNWDSH
LSSICTPADPAASSSERGCGPAVTTVGLVGFLSHSATKTEWEDAYRCVNASTANAERV
PNGLKFAGVGGGALWPVSQQGQNQRYRFANHAFTVVASVTIHEVPSVASPLLGASLDS
SGGKKLLGLSYDERHQWQPIYGSTPVTPTGSWEMGKRYHVVLTMANKIGSEYIDGEPL
EGSGQTVVPDERTPDISHFYVGGYKRSDMPTISHVTVNNVLLYNRQLNAEEIRTLFLS
QDLIGTEAHMDSSSDTSA

FIG.4

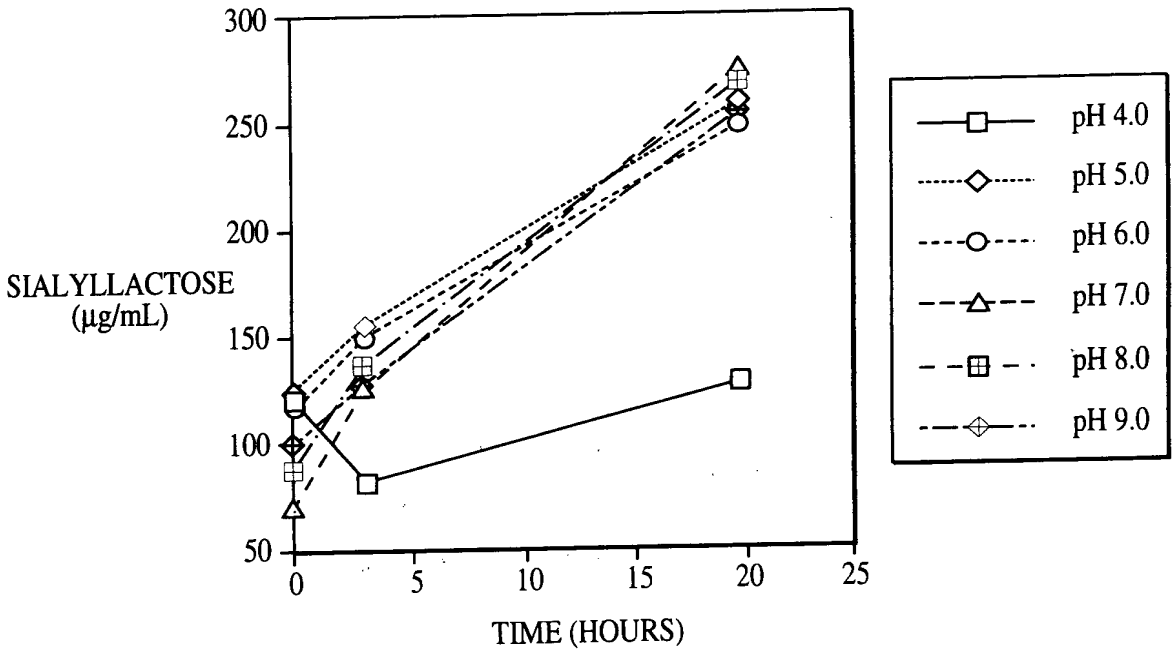
300
250
200
150
100
50
SIALYLLACTOSE
(µg/mL)
0
5
10
15
20
25
TIME (HOURS)
pH 4.0
pH 5.0
pH 6.0
pH 7.0
pH 8.0
pH 9.0

FIG.5

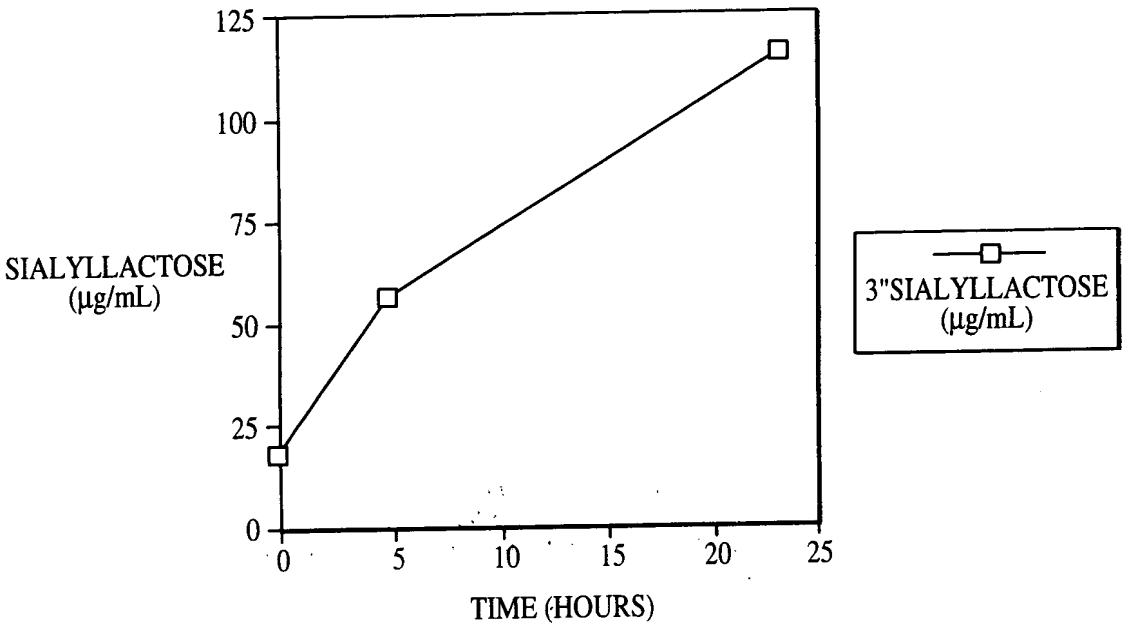
125
100
75
50
25
0
SIALYLLACTOSE
(µg/mL)
0
5
10
15
20
25
TIME (HOURS)
3"SIALYLLACTOSE
(µg/mL)

FIG.6

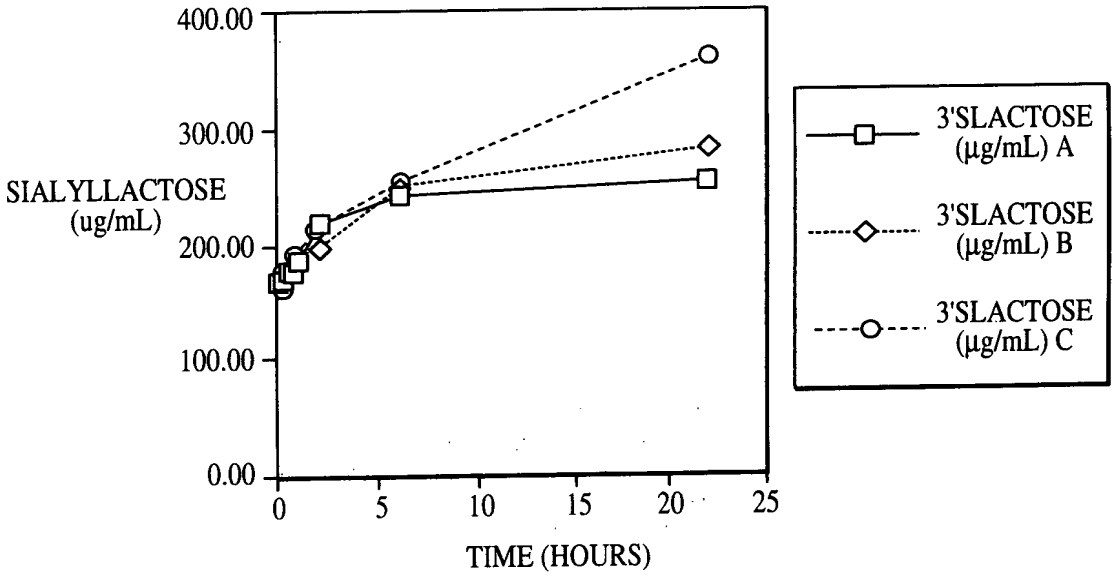
400.00
300.00
200.00
100.00
0.00
SIALYLLACTOSE
(ug/mL)
0
5
10
15
20
25
TIME (HOURS)
3'SLACTOSE
(µg/mL) A
3'SLACTOSE
(µg/mL) B
3'SLACTOSE
(µg/mL) C

FIG.7A

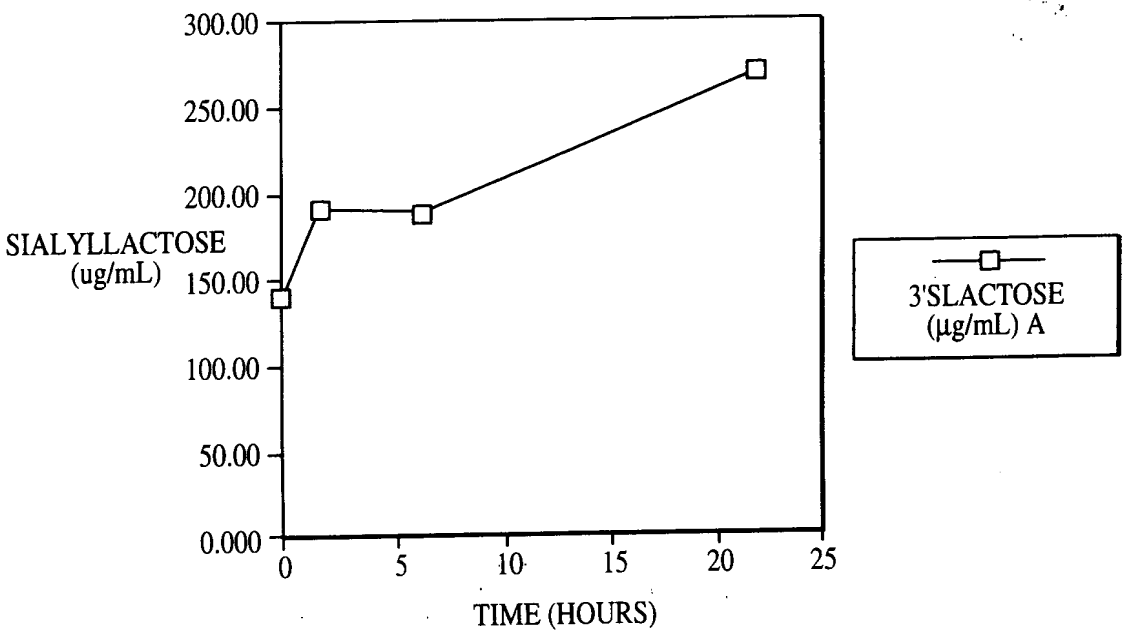
300.00
250.00
200.00
150.00
100.00
50.00
0.000
SIALYLLACTOSE
(ug/mL)
0
5
10
15
20
25
TIME (HOURS)
3'SLACTOSE
(µg/mL) A

FIG.7B

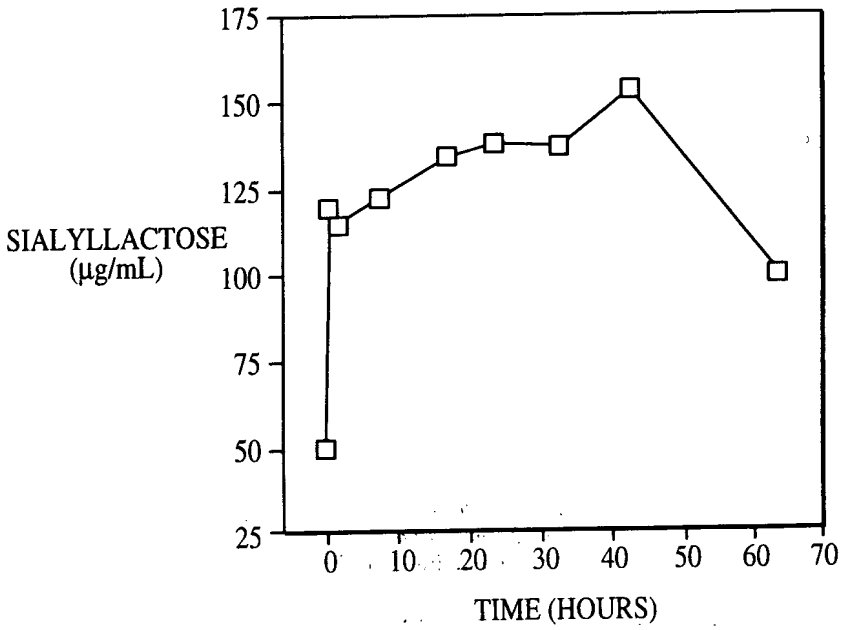
175
150
125
100
75
50
25
SIALYLLACTOSE
(µg/mL)
0
10
20
30
40
50
60
70
TIME (HOURS)

FIG.8

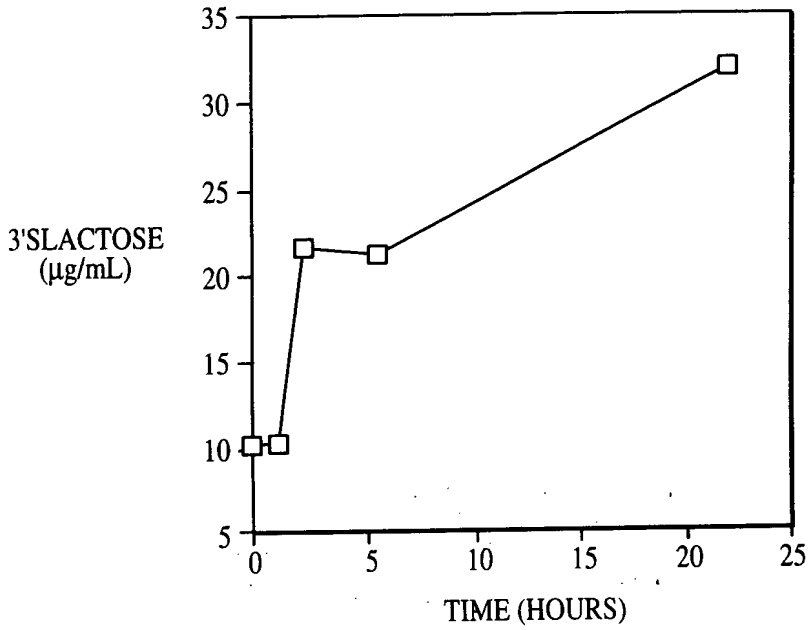

FIG.9